Ashley-Edison (UK)

SES SERIES

THREE PHASE

AC Automatic Voltage Stabilisers / Regulators





OPERATOR MANUAL

WITH SECTIONS ON INSTALLATION & FRONT LINE SERVICE

CE

Please read these notes carefully:

- This manual contains information concerning the safe and proper installation and operating procedures applicable to the SES range of Three Phase AC Voltage Stabilisers / Regulators.
- The manual should be read in full before attempting to use, or operate the equipment.
- If any problems are encountered with the procedures contained within this manual then seek assistance from Ashley-Edison or the distributor from whom you purchased the equipment.
- Whilst every precaution has been taken to ensure the accuracy and completeness of this manual, Ashley-Edison assumes no responsibility and disclaims all liabilities for damages resulting from use of this information or any error or omission.

This manual is published by
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1. INTRODUCTION

1.1 OVERVIEW

SES Automatic AC Voltage Stabilisers & Regulators provide electrical and electronic load equipment with a reliable and stable voltage supply, free from mains borne voltage disturbances and fluctuations which might otherwise cause damage to the load equipment.

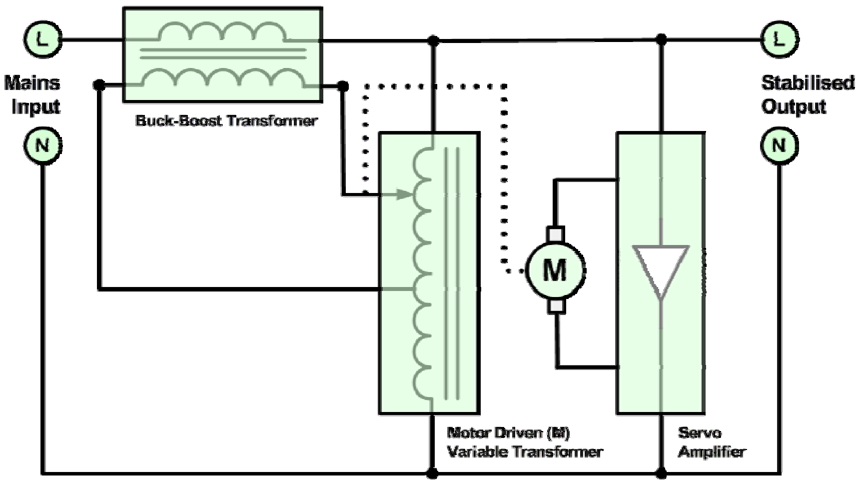


Capable of regulating the supply voltage to virtually any type of electrical or electronic equipment, the latest generation of Ashley Edison Servo-Electronic based AC Automatic Voltage Stabilisers continue to lead the market by setting new higher performance levels, whilst always ensuring unparalleled reliability and versatility.

1.2 PRINCIPLE OF OPERATION

Over the last 25 years our Servo Electronic ranges have been tried, tested and extensively proven in all corners of the world – including some of the harshest and most remote power environments on this planet.

From the blistering heat of Arabian Desert to the sub-zero temperatures and remoteness of the Caucasian mountains, our Servo Electronic Stabilisers and Conditioners can be found on duty offering protection to vital equipment where the supply must never be found wanting – not even for a single second!



Being able to accommodate an input voltage swing of in excess of 40%, whilst still delivering accuracy on the output of 1% or better, the Servo Electronic design principle comprises a transformer having its secondary winding connected between the mains supply and the load. The primary voltage is automatically controlled through a servo motor driven variable transformer, thereby ensuring a continuous, smooth and very stable output voltage.

A solid state Servo-Amplifier continuously monitors the output voltage of the stabiliser. Should, due to an incoming voltage or load current change, the output voltage deviate from the required value, the Amplifier sensor instructs the servo motor to rotate the brush-gear on the variable transformer to correct the output for the deviation. The speed of detection and actions of the servo system are exceptionally fast, with controlled motor deceleration to minimise any possibility of overshoot.

Over the years with advances in semi-conductor, motor and digital technologies, our development engineers have considerably enhanced the performance of the basic design principle. Our latest Servo Electronic generation of solutions deliver the most reliable, fastest acting, highly stable and most energy efficient operation seen in the market today.

For details on the Technical Specification of the SES Range of Three Phase AC Automatic Voltage Stabilisers see Section 10.1 in the Appendix to this manual.

For General Circuit Diagrams on the SES Three Phase AC Voltage Stabilisers, please refer –

- For **4 Wire SES Three Phase Stabilisers –** H & LY Series **–** see Section 12.3 in the Appendix to this manual
- For **3 Wire SES Three Phase Stabiliser** – HD & LD Series – see Section 12.4 in the Appendix to this manual.

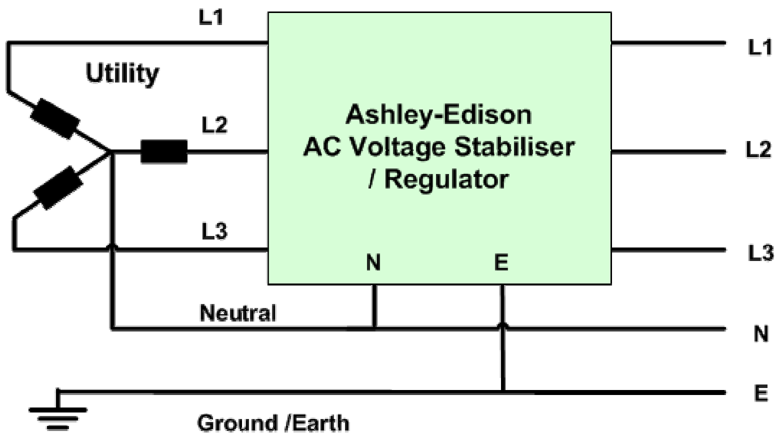
1.3 VOLTAGE CONFIGURATIONS

SES Three Phase AC Automatic Voltage Stabilisers are available as High *(H Series – International)* and Low *(L Series - US)* voltage models.

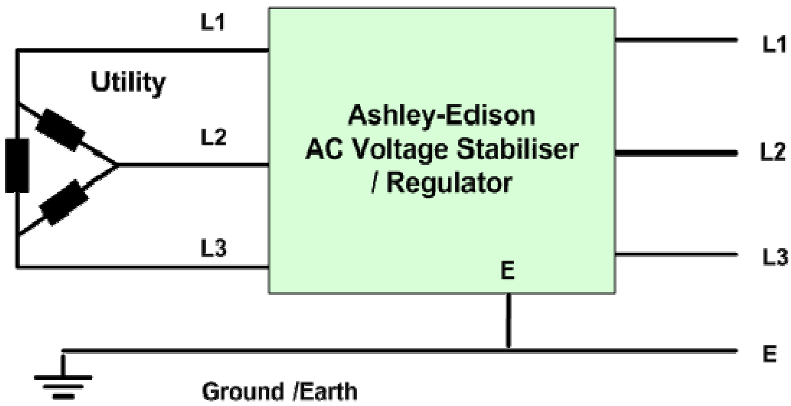
Series	**Three Phase Voltages (Output Voltages available from)**
• **H Series**	380 to 415V (4 & 3 Wire) (440 & 480V to special build)
• **L Series**	190 to 240V (4 & 3 Wire)

Three Phase models are offered as either 4 Wire (3 Phase + Neutral) or 3 Wire (3 Phase with NO Neutral) solutions.

1.3.1 4 WIRE CONFIGURATIONS (H & LY MODELS)



1.3.2 3 WIRE CONFIGURATIONS (HD & LD MODELS)



2. SAFETY NOTE

2.1 INTRODUCTION

These instructions are addressed to the Installer and End User / Operator of the SES Series of Three Phase AC Voltage Stabiliser / Regulator. We strongly suggest you keep this manual next to the Stabiliser for future reference.

2.2 GENERAL – INSTALLATION & USAGE

- Do not use the Stabiliser for other than the intended use.

- Do not install stabiliser in a backfeed circuit to the grid, input voltage supply cannot be connected to the output of stabiliser

- If on delivery there is evidence of visible damage, do not attempt to install or start the Stabiliser. Advise the transport delivery company and inform Ashley-Edison, or the resale partner from whom you purchased the equipment.

- The Stabiliser can contain potentially dangerous voltages – up to 600 V AC. Use extreme caution when opening the covers and do not leave the unit unattended with the doors open or covers off.

- Hazardous voltages can be present at the unit's output any time AC input power is applied. To avoid possible personal injury, or equipment damage, and to make certain there is no output voltage, turn the unit off and disconnect the AC Input.

- To reduce the risk of fire, or electrical shock, install the unit in an indoor area free from conductive contaminants.

- Do not use outdoors.

- Do not place the unit near water or liquids, gas and combustible materials or in an excessively humid environment where condensation is very likely to occur.

- To reduce the risk of overheating, do not block the unit's ventilation panels and try to avoid positioning the unit in direct strong sunlight or close to other heat sources.

- Do not allow liquids or foreign objects to enter the unit.

- The installation and use of this product must comply with all relevant current electrical installations that are in force in the territory of installation.

- Only qualified electrician shall install the equipment. The electrician shall install the AC input according to the instructions contained in this manual. Standard safety practices should be followed at all times.

- The unit must be grounded or earthed at all times when in use.

- Do not operate the Bypass Control Switch *(or optional inbuilt Manual Bypass Switch, if fitted)* when the Stabiliser is supporting load, as severe damage can be caused to the equipment and potentially the load. Load to be switched OFF before operating bypass switches.

- If an External Manual Bypass Switch is to be used with the unit, the bypass switch must be installed according to the Installation Instructions supplied with the switch. Before operating the switch the input supply should be checked for the correct phase rotation.

2.3 SYMBOL WARNING INFORMATION

The following symbols are used through out this manual.



Danger
This symbol alerts you to important information.



Electrical Hazard
This symbol indicates an electrical hazard may be present.

3. TRANSPORT, DELIVERY, STORAGE & UNPACKING

3.1 TRANSPORT

- The Stabiliser should only be transported in an upright position.
- Move the unit in its original packaging to its final position / location, taking due note of the system's centre of gravity.
- Do not stack other packages on top of the unit.
- If the Stabiliser has to be lifted, use carrying belts or a forklift.
- Do remember to check for sufficient floor and lift / elevator loading capacity.

3.2 DELIVERY

- When delivered, check carefully the packaging integrity. Check the crate for evidence of damage or signs of mishandling and look for indication of any physical damage to the Stabiliser.
- Should any damage be observed, immediately notify the shipping agent / transport company and inform Ashley-Edison, or the resale partner from whom you purchased the equipment. A detailed report on any damage observed will probably be required to support any indemnity / insurance claim.

3.3 STORAGE

- The units are carefully packed for shipment to ensure when they are installed, they are in a perfect condition.
- Never leave a Stabiliser outside and do not store the system one on top of another.
- Should the Stabiliser be placed in storage prior to installation, it is advisable to ensure the system is stored in its original packing in a dry, dust free room and far away from any chemical substances.

3.4 UNPACKING

- SES Stabilisers are despatched from the factory in purpose designed ruggedised carton boxes or wooden crates.
- Once on site, it is strongly recommended that the unit should be moved to its final position whilst still in its packaging.
- Open the shipping crate / box carefully ensuring that the Stabiliser is not inadvertently damaged. Special care should be taken when utilising a sharp opening tool.

- Having removed the external packaging and prior to commencing installation works, any vapour barriers and / or internal support transportation fixings should be carefully removed.
- If any damage, as a result of shipping is observed, immediately notify the shipping agent / transport company and inform Ashley-Edison, or the resale partner from whom you purchased the equipment.
- **DO NOT** install the Stabiliser if there is any sign of damage.

WARNING!

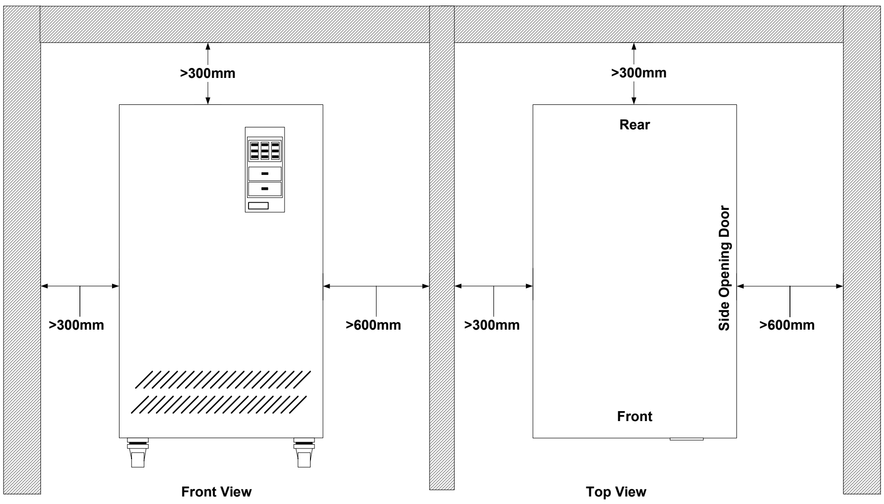


DO NOT LEAVE THE AUTOMATIC VOLTAGE STABILISER DOOR/S OPENED FOR LONG PERIODS OF TIME OR IN THE ABSENCE OF AUTHORISED PERSONNEL.
ONLY QUALIFIED PERSONNEL IS ALLOWED TO SERVICE THIS EQUIPMENT.

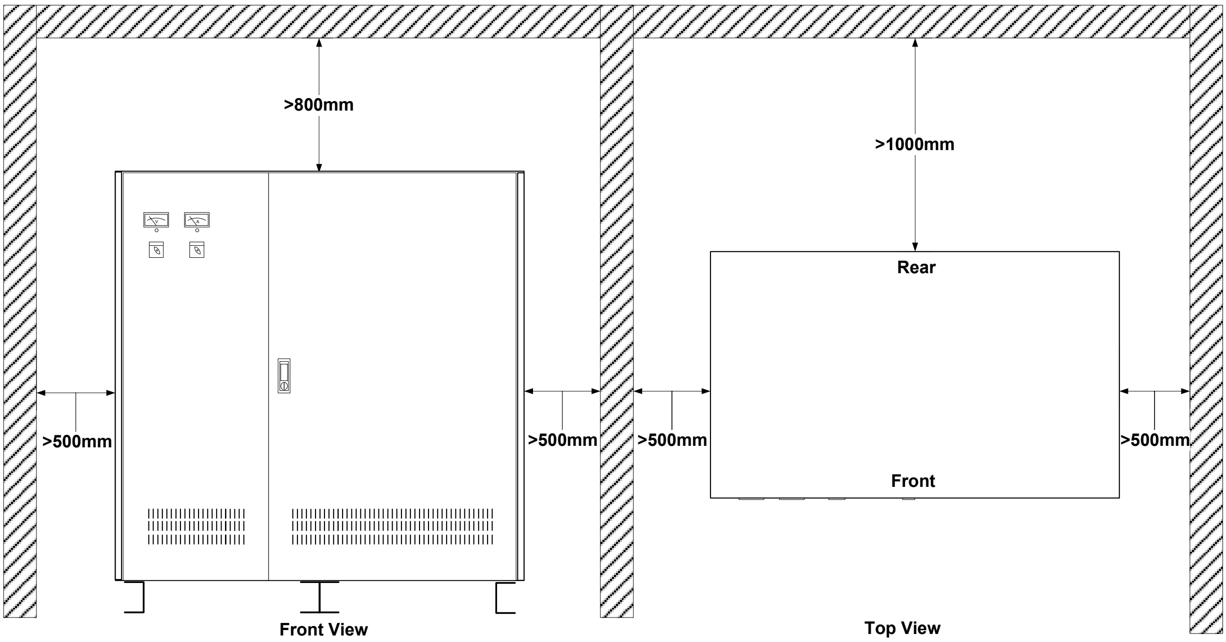
4. POSITIONING, VENTILATION & COOLING

- Check for sufficient floor loading capacity before installing the Stabiliser.
- The unit should be installed indoors in a clean, dust-free location, which has adequate ventilation or air-conditioning.
- The Stabiliser is designed to operate within an ambient temperature range of -15 to 45°C - up to an altitude of 1000 metres. When installed in greater ambient temperatures and / or altitudes, the maximum rating of the machine should be derated by 2% for each additional °C, up to a max of 60°C, and 2.5% for each additional 500 metres.
- SES Stabilisers are forced air-cooled and the airflow paths should not be obstructed.
- The temperature of the air entering SES unit cubicles should not be allowed to exceed the temperatures stated above.
- To facilitate ease of maintenance and to ensure sufficient airflow movement, it is recommended the units are positioned :-

Enclosures with Castors



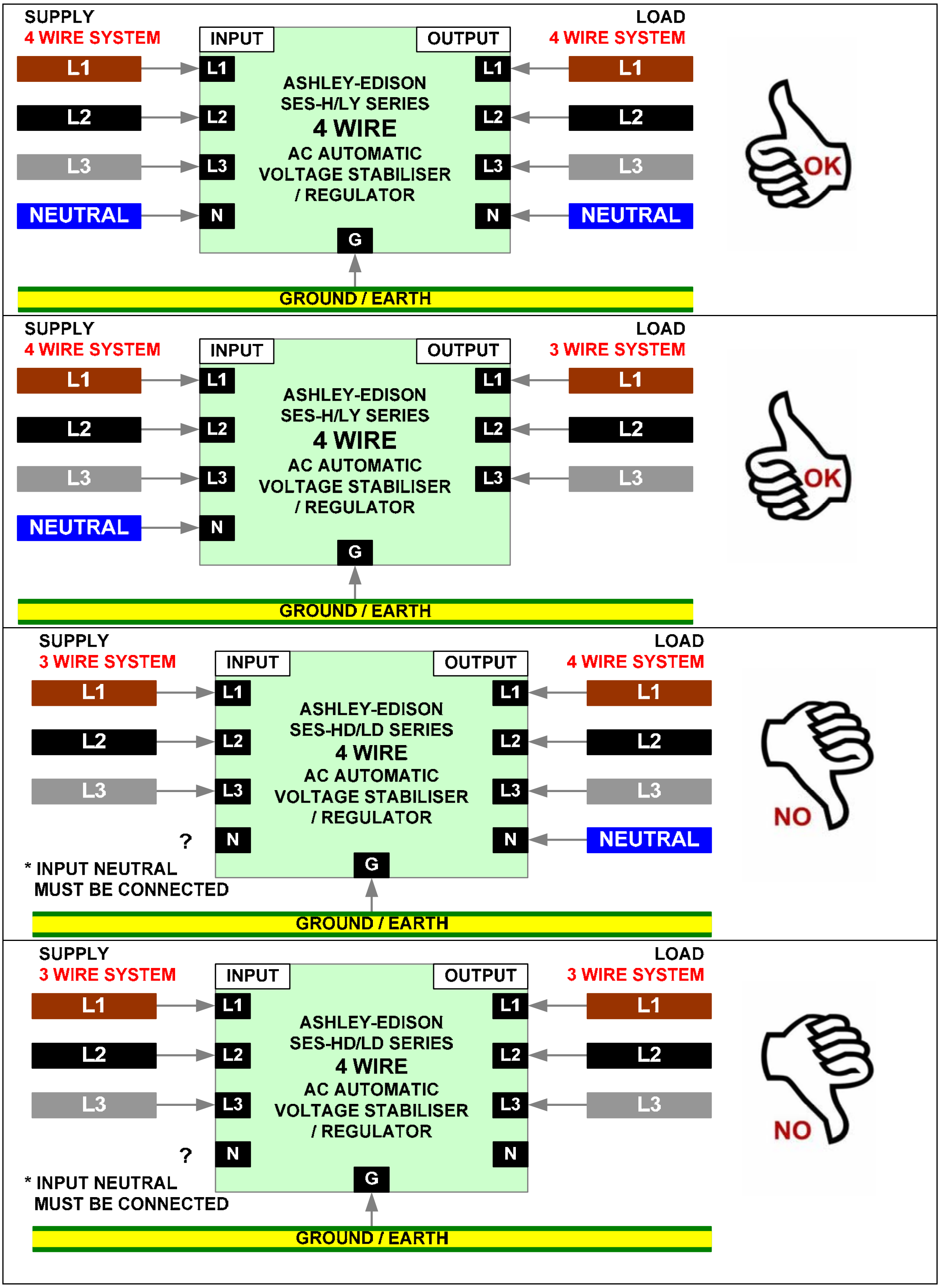
Non Castor Enclosures



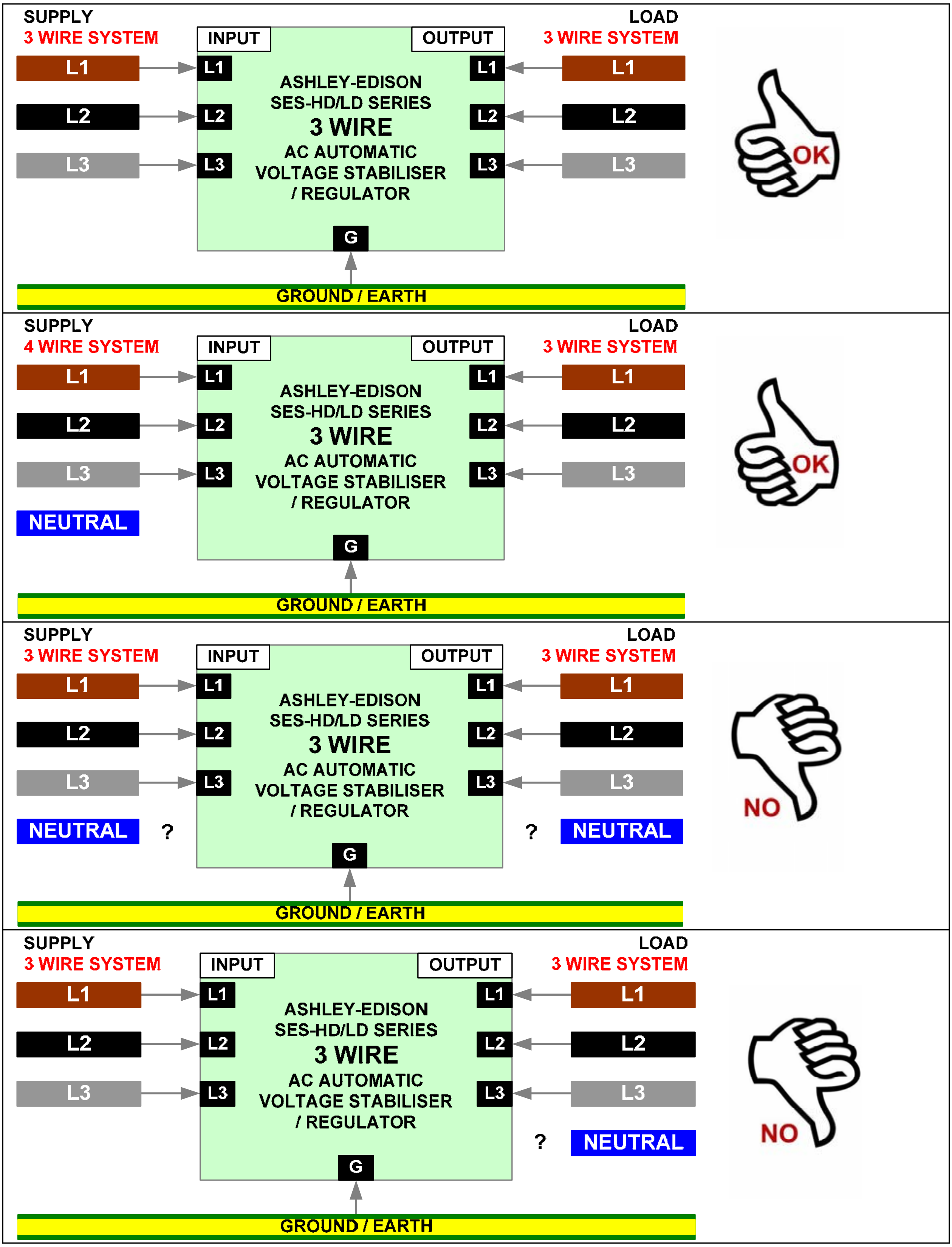
- For further information on cubicle sizing please refer to the Appendix Section 12.2 of this manual - *Enclosure Types.*
- When operational, the Stabiliser itself will generate a certain amount of heat, which will be blown out through the vents on the cubicle. The User should ensure that the room where the Stabiliser is located has sufficient adequate cooling / ventilation facilities to remove the heat. It is imperative that the air should be able to freely circulate through the air inlets and outlets on the Stabiliser.
- **DO NOT** put anything on top of the cabinet or restrict the flow of air to and from the system.

5. ACCEPTABLE INPUT COFIGURATIONS

5.1 FOUR (4) WIRE STABILISERS (H & LY SERIES)



5.2 THREE (3) WIRE STABILISERS (HD & LD SERIES)



6. ELECTRICAL INSTALLATION & CABLING

6.1 INTRODUCTION

- Electrical installation of the equipment should only be carried out by a qualified electrician following best safety practices at all times.
- The cabling of the Stabiliser has to be sized according to the selected rating of the Stabiliser.
- The cable size selected should comply with local regulations for installation requirements.
- While normally all SES Stabilisers are fitted as standard with an input circuit breaker, in circumstances where such protection is not incorporated, the Installer must install suitable circuit protection.
- When the SES Stabiliser is fitted with an input breaker, care must be taken to ensure that the supply fuses/breaker is correctly sized to provide tripping discrimination between the circuit protection devices in the event of a fault.
- Before connecting the unit, it is essential that the mains voltage is verified and the Stabiliser's selected output load voltage is in accordance with local / required requirements.
- Check that the rating of the load shall not exceed the rating of the Stabiliser - as shown on the unit's rating plate. The load current should be measured using a true RMS reading meter.
- To ensure safety and the optimum performance of the Stabiliser, it is imperative that the machine is properly earthed / grounded.
- When cutting holes for cable entry and glanding care should be taken to ensure that no swarfs enters the unit. Block off all unused holes.
- In situations where the supply cannot be switched off to facilitate machine maintenance, it is recommended that a maintenance manual bypass switch is installed. This will ensure the availability of a direct mains supply for the load whilst the Stabiliser is being serviced.

6.2 CABLE CONNECTIONS

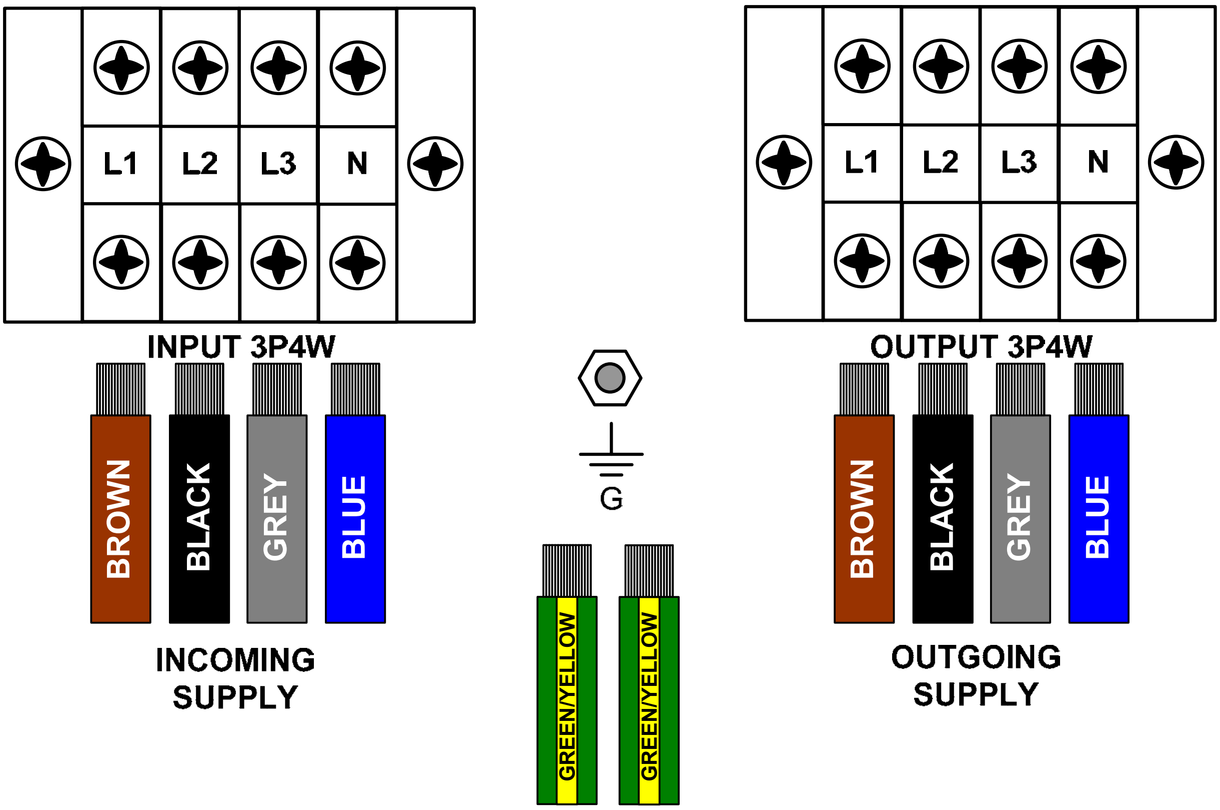
6.2.1 THREE PHASE 4 WIRE (H & LY SERIES)

- Connect the mains input supply to terminals marked INPUT **(L1, L2, L3)** and NEUTRAL (**N**). <u>This Neutral cable MUST be connected.</u>
- Connect the load to terminals marked **OUTPUT (L1, L2, L3, N)**

IMPORTANT NOTICE:

For Three Phase 4 Wire Systems (with Neutral Connection), the <u>Input Neutral must be connected.</u> Failure to connect the neutral will cause damage to the Voltage Stabiliser.

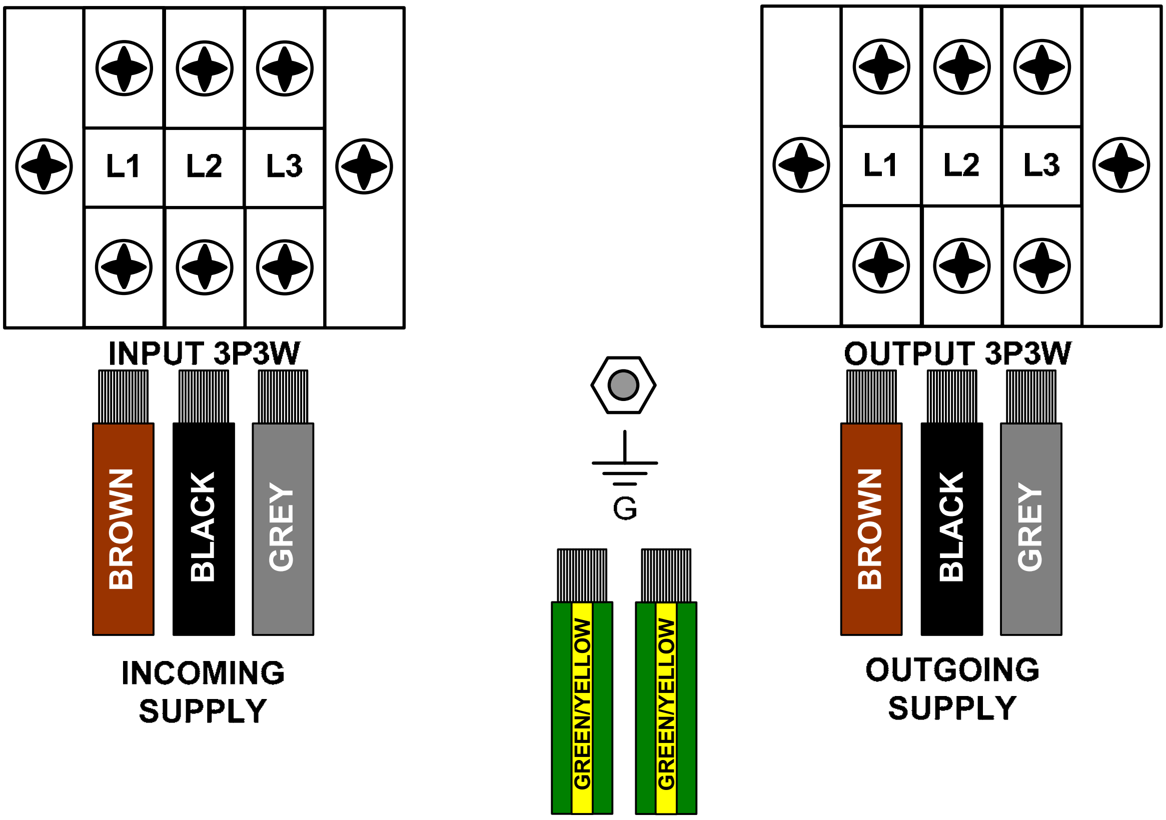
Connect the wiring as follows:



6.2.2 THREE PHASE 3 WIRE (HD & LD SERIES)

- Connect the mains input supply to terminals marked INPUT (L1, L2, L3).
- Connect the load to terminals marked **OUTPUT (L1, L2, L3)**

Connect the wiring as follows:



6.2.3 CABLE COLOUR CODING

- As from 1 March 2011, Cable Colour Coding has been harmonised with IEC 60364 and CENELEC HD 60384 (incorporating the 17TH IEE Wiring Regulations – BS 7671:2008).

New Cable Colour Code



7. COMMISSIONING

7.1 PRE-COMMISSIONING CHECKS

- Make sure the input switch to the Voltage Stabiliser is in the “OFF” position.
- Check to ensure all the load switches are in the “OFF” position.
- Before you switch “ON” the mains, visually inspect the Automatic Voltage Stabiliser.
- If dust has accumulated during installation, clean the Voltage Stabiliser thoroughly with compressed air or with a soft brush. Should any swarf be found in the unit, these should be removed.
- Check the Ground connection, ensuring it is connected tightly.
- Check all wiring connections to ensure none have worked loose during transit. As required, tighten any loose connections.
- Ensure that the incoming mains supply is available and check with a true RMS meter that the voltage is in accordance with the particular Voltage Stabiliser technical specification

7.2 COMMISSIONING PROCEDURE

Follow the Switch On procedure as described in *Section 8.1.*

Having successfully commissioned the system, please take note of the commissioning date and bear in mind that the system should be routinely maintained on an annual basis in accordance with the procedures laid out in *Section 10.2 - Routine Maintenance & Service* of this manual.

- **Adjusting the Output Voltage**
  The unit will have been shipped configured to deliver the output voltage as specified by the customer at time of ordering. Should it be deemed necessary to adjust the output voltage please refer to *Section 9 – Output Voltage Adjustment* in this manual.
- **Activating the Over/Under Voltage & Phase Failure Protection Features**
  By default the Over / Under Voltage and Phase Failure protection features are disabled. To activate these trip features, the switch (SW1) on the Servo Amplifier PCB should be set before commencing commissioning of the unit to the “OFF” position - see Servo Amplifier PCB drawing in the *Section 9* of this manual.

8. OPERATION

8.1 START UP PROCEDURES

With the Voltage Stabiliser Powered down and the load switched "OFF" –

- Switch the Input Circuit Breaker to the "ON" position.

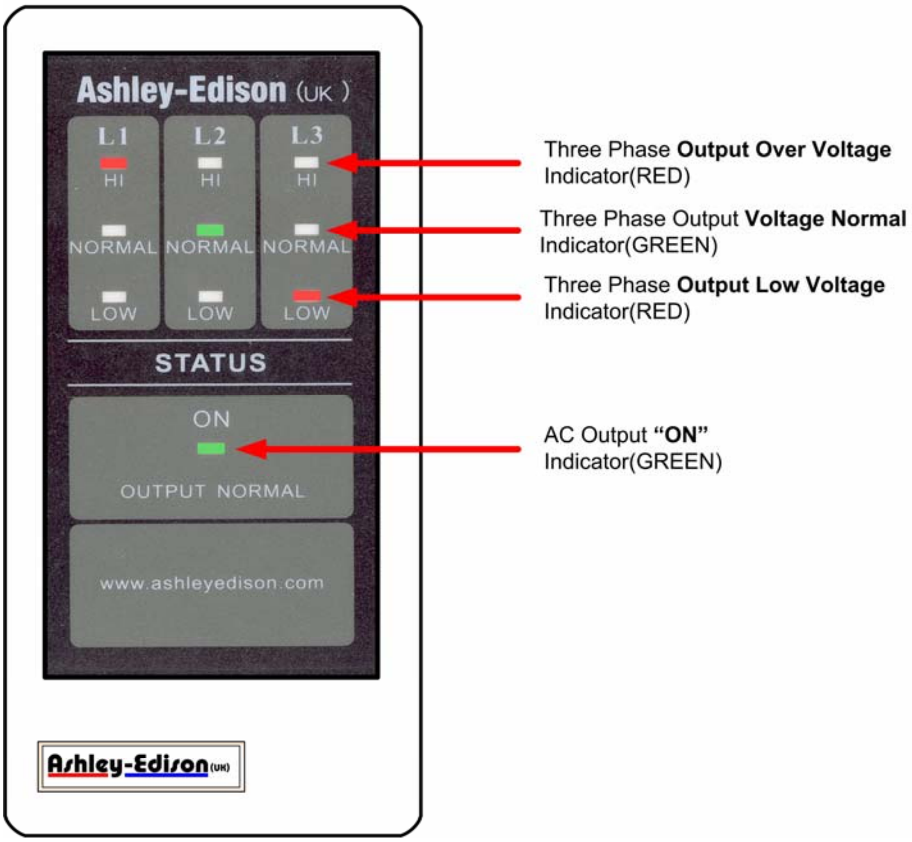
- The "OUTPUT" light on the Front Display Panel should then indicate green to show the Stabiliser is switched "ON". – see *Section 8.2 – Control Display Panel.*

- After switching "ON" the Automatic Voltage Stabiliser, the output voltage from the stabiliser will rise to the pre-determined set value. The Stabiliser should then automatically continue to maintain the voltage at this level – in accordance with the selected unit's specification.

- Turn on the load equipment. (If the stabiliser is fitted with an optional Output Circuit Breaker), switched the Output Circuit Breaker to the "ON" position.

8.2 CONTROL DISPLAY PANEL – ALARMS & EVENTS

FRONT DISPLAY PANEL



8.3 SHUTDOWN PROCEDURE

With the load equipment powered down --

- Switch the Input Circuit Breaker to the “OFF” position.
- The “OUTPUT” light on the Front Display Panel should now be extinguished, indicating that the Stabiliser is switched “OFF”.

8.4 BYPASS CONTROL SWITCH

The Voltage Stabiliser is fitted as standard with a Bypass Control Switch. This switch allows the bypassing of the electronic control circuits. This is to enable main supply to be fed to the load (without regulation).

WARNING!



- **The switching / operation of this switch** *(and that of any optional Manual Maintenance Bypass Switch)* **should not be performed while the stabiliser is still supporting load.**
- **Switching whilst on load could easily damage the stabiliser and potentially the load equipment.**

Please do not ignore the warning label by the Control Switch!!!

9. OUTPUT VOLTAGE ADJUSTMENT

9.1 INTRODUCTION

The Stabiliser will normally be supplied factory pre-set for the voltage requested at time of ordering. Should the output voltage be required to be adjusted / recalibrated this can be achieved by adjusting the settings on the Servo Amplifier PCB.

It should be noted that as a general rule for H, HD, LY & LD series models the permissible input voltage swing is stated relative to the set output voltage.

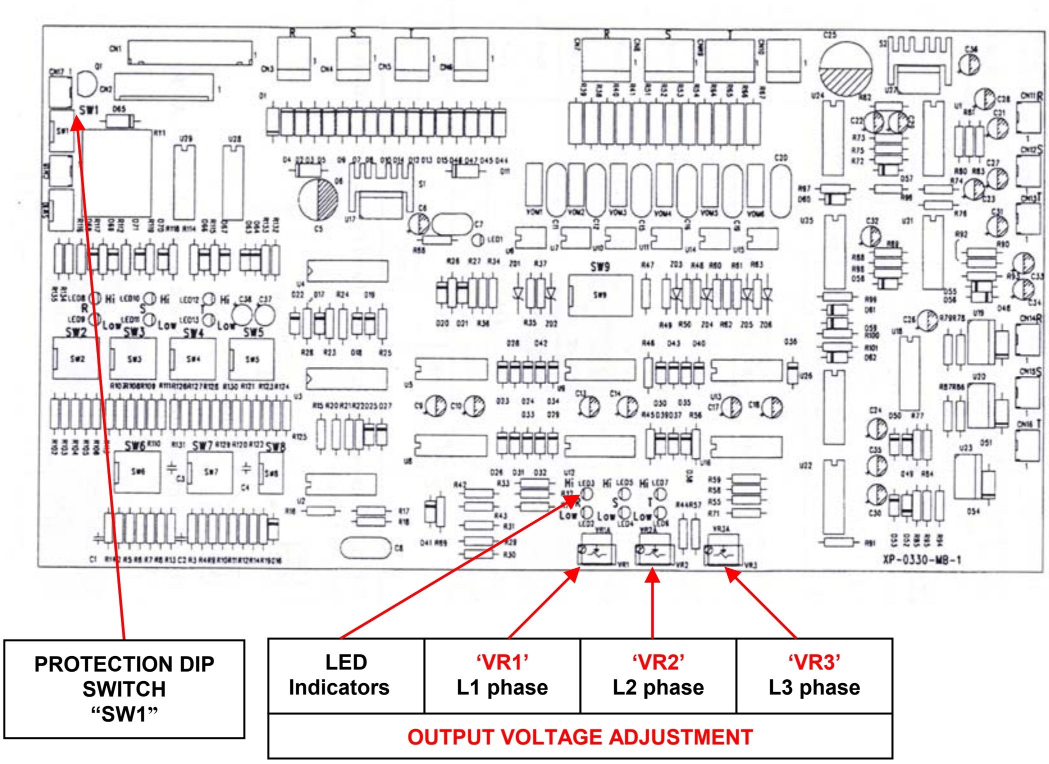
WARNING!



Adjusting the Output Voltage should only be carried out by duly qualified personnel.
The Stabiliser can contain potentially dangerous and life threatening voltages – up to 600 V AC. Use extreme caution when opening the covers and do not leave the unit unattended with the doors open or covers off.

9.2 VOLTAGE ADJUSTMENT PROCEDURE

- Altering the output voltage on the stabiliser is done by adjusting a screwdriver slotted potentiometer on the Servo Amplifier PCB (see below).
- The three pots (one per phase) are clearly marked on the board - **'VR1', 'VR2', 'VR3'.**



VR	Adjustment	Indicators	Feature
VR1	Clockwise	LED3, Hi light " ON "	**L1** phase voltage increase
	Anti-Clockwise	LED2, Low light " ON "	**L1** phase voltage decrease
VR2	Clockwise	LED5, Hi light " ON "	**L2** phase voltage increase
	Anti-Clockwise	LED4, Low light " ON "	**L2** phase voltage decrease
VR3	Clockwise	LED7, Hi light " ON "	**L3** phase voltage increase
	Anti-Clockwise	LED6, Low light " ON "	**L3** phase voltage decrease

9.2.1 FOR 4 WIRE SOLUTIONS (H & LY SERIES)

- Measure the 'Neutral' to output voltage and adjust each line as required. Example, place the first meter probe on the output 'Neutral' and the other meter probe on the output 'L1 Phase' - adjust pot 'VR1', until the voltage meets the required value.
- Continue with the other two output phases - L2 & L3 - with the first probe still on the 'Neutral', the other probe on the relevant output phase and adjustments being made to relevant phase pot on the Servo Amplifier PCB.

9.2.2 FOR 3 WIRE SOLUTIONS (HD & LD SERIES)

- Measure the 'output voltage Line to Line ie. L1 to L2 and adjust as required. Example, place the first meter probe on the output 'L1 Phase' and the other meter probe on the output 'L2 Phase' - adjust pot 'VR1', until the voltage meets the required value.
- Continue accordingly with the other two output phases - L2 to L3 and L3 to L1 with adjustments being made to relevant phase pot on the Servo Amplifier PCB.

9.3 OVER / UNDER VOLTAGE & PHASE FAILURE PROTECTION

- **SW1 Switch** on the Servo Amplifier PCB activates the Over / Under Voltage & Phase Failure Protection features. By default these protection features are deactivated.
- With activation, should the outgoing voltage from the Stabiliser drift, other than momentarily, by 15% or more, the Stabiliser's input circuit breaker will automatically trip – thereby protecting the load.
- To minimise the possibility of nuisance tripping, this setting is set by default at 15%. If required, the sensitivity setting can be recalibrated to 9% – please refer to the Ashley-Edison Service Department for guidance. However, in the interest of ease for all, it is normally recommended that the machine be supplied already pre-calibrated by our factory engineers for the lower setting.

10. MAINTENANCE & SERVICING

10.1 INTRODUCTION

With extremely high reliability (MTBF >125,000 Hours), SES Stabilisers require an exceptionally low level of ongoing annual (or biennial) maintenance or servicing.

Front line servicing, maintenance and most remedial work can usually be performed by universally available skill sets held by most competent qualified electricians.

With our strategically located dedicated teams of technical support specialists and field service engineers, we are always on-hand to offer email or telephone technical support and, where deemed appropriate, direct on-site assistance.

10.2 ROUTINE MAINTENANCE PROCEDURES

In order to ensure reliability and optimise the service life of the unit, we recommended that the Voltage Stabilizer is subject to periodic (annual or biennial) inspections and maintenance.

WARNING!

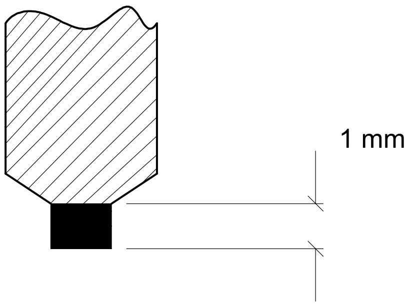


The procedures detailed below should only be carried out by duly qualified personnel.

The Stabiliser can contain potentially dangerous and life threatening voltages – up to 600 V AC. Use extreme caution when opening the covers and do not leave the unit unattended with the doors open or covers off.

Before attempting any maintenance it is imperative that the mains supply to the AC Automatic Voltage Stabiliser is switched off.

Basic maintenance procedures should include –

Visual Inspection	Check to ensure that there are no obvious signs of damage to any of the components in the system. Check all wiring connections to ensure none have worked loose. As required, tighten any loose connections. Check the cooling fans to ensure they are rotating freely.
Cleaning	Ensure the Stabiliser is kept free from dust and dirt. Blow out any dust or dirt ideally with compressed air or alternatively remove with a soft brush.
Carbon Brush Inspection	Ensure that the tips on the variable transformers carbon brushes are at least 1mm in thickness.
WARNING!  **Do not attempt to manually force the Brush Gear and associated Carbon Brushes to rotate. Rotation will damage the Servo Motor and associated Brush Gear.**	 If 1mm, or less, replace the carbon brush. Ideally spare carbon brushes should be held on site – see *Section 10.3 – Recommended Spares* below.
Output Voltage Adjustment	Upon repowering the machine, check the output voltage settings. If necessary, adjust the output voltage – as described in *Section 9 – Output Voltage Adjustment* in this manual.

10.3 RECOMMENDED SPARES

Recommended On-Site Spare Parts holdings include –

Description	**AE Part Ref.**	**Quantity**
Variable Transformer Carbon Brushes	VT1~3 CB	3
Fuses	F1~4	10
M.O.V	MOV1~3	3
Fan	FAN	1
Filter Protection	FP1~3	3
Power Relays	PR1~3	1
Sensor Amplifier PCB	SA	1
Variable Transformer Module	VT1~3	1

Note: *Power Relays and Fans for models rated below 15 kVA are not required.*

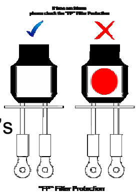
For more detailed individual model spares listings and pricing, please contact the Service Department at Ashley-Edison, or the resale partner from whom you purchased the equipment.

10.4 FRONT LINE TROUBLESHOOTING

WARNING!



The front line remedial action procedures detailed below should only be carried out by duly qualified personnel.
The Stabiliser can contain potentially dangerous and life threatening voltages – up to 600 V AC. Use extreme caution when opening the covers and do not leave the unit unattended with the doors open or covers off.

	Suggested Checks	Remedial Action Required
1.	**Check all fuses**, ensuring that none are blown.	If necessary, replace any blown fuses.
2.	**Check all FP – Filter Protection / F1~F3 Fuses**, ensuring that none are blown	Replace any blown FP's. Filter Protection are labelled with sticker. Should sticker appear "RED", it is important to replace with new FP's **together with any blown fuses, F1~F3**. If fuses F1~F3 blown, it is due to blown / faulty FP's and **both should be replaced at same time**. Stabiliser will not regulate if these are not replaced. 
3.	**Check all MOVs**, ensuring that none are blown	If necessary, replace any blown MOVs.
4.	**Inspect all wiring connections / mechanical links** to ensure none have worked loose.	As required, tighten any loose connections
5.	**Check all Cooling Fans**, ensuring that all are rotate freely.	If necessary, replace any seized or suspect noisy/faulty fans.
6.	**Check the operation of the Servo Amplifier Card** - see *Section 9 – Output Voltage Adjustment* in this manual. Turn the output voltage setting potentiometer to check if the Amplifier Card is working correctly. As you adjust the pot, the variable transformer will rotate accordingly. When you increase the pot, the variable transformer will rotate in one direction and vice versa. If no problems are encountered, do not forget to reset the output voltage settings to the required output voltage levels.	**(1)** If operation does not work accordingly, switch "OFF" the Stabiliser, switch the Bypass Control Switch to **"Bypass"** mode and start up the Automatic Voltage Stabiliser. This is a temporary measure until spares are available for replacement. This will allow you to have an output supply without regulation. Even in this bypass configuration, Over / Under Voltage and Phase Failure Protection is in operation. **(2)** Replace Servo Amplifier PCB: With the Voltage Stabiliser powered "OFF", replace the faulty Servo Amplifier card and reset the Bypass Control Switch back to **"Auto"** mode. Switch on the stabiliser The Automatic Voltage Stabiliser should now be operating satisfactorily. **(3)** If after replacing PCB, the Automatic Voltage Stabiliser is still not working, it is highly probable the problem rests with the servo motor.If the Servo Motor is found to be faulty, replace the motor accordingly.

NOTE: *In the event of mis-operation of the Control Bypass Switch, it is highly likely the fuses and MOVs will blow and probably cause damage to the Servo Amplifier Card.*

Should problems persist, please contact the Service Department at Ashley-Edison, or the resale partner from whom you purchased the equipment.

11. STANDARD WARRANTY

11.1 STANDARD WARRANTY

In purchasing an Ashley-Edison AC Automatic Voltage Stabiliser / Regulator, you are investing in a standard of Quality which fulfils the highest of requirements.

As a sign of our trust in this Quality, we are pleased to be able to offer you truly market leading warranty protection.

THE SES WARRANTY

Subject to the limitations set out below, Ashley-Edison warrants that the products will correspond with their specification at the time of despatch and will be free from defects in material and workmanship for a period of -

3 YEARS / 36 MONTHS

from date of shipment.



11.2 LIMITATIONS OF WARRANTY

- Ashley Edison shall not be under liability in respect of any defect in the products arising from any drawing, design or specification supplied by the customer.
- We shall be under no liability in respect of any defect arising from fair wear and tear, wilful damage, negligence, abnormal working conditions, failure to follow our instructions (whether oral or in writing), misuse or alteration or repair of the products without our approval.
- We shall be under no liability under the warranty (or any other warranty, condition or guarantee) if the total price for the product has not been paid by the due date for payment.
- The stated warranty does not extend to parts, materials or equipment not manufactured by us, in respect of which the customer shall only be entitled to the benefit of any such warranty or guarantee as is given by the manufacturer to us.
- Subject as expressly provided in our standard conditions and terms of sale and except where the products are sold to a person dealing as a consumer (within the meaning of the Unfair Contract Terms Act 1977), all warranties, conditions or other terms implied by statute or common law are excluded to the fullest extent permitted by law.
- Where the products are sold under a consumer transaction (as defined by the Consumer Transactions (Restrictions on Statements) Order 1976) the statutory rights of the customer are not affected by these Conditions.
- Any claim by the customer which is based on any defect in the quality or condition of the products or their failure to correspond with specification shall (whether or not delivery is refused by the customer) be notified to us within 4 days from the date of delivery or (where the defect or failure was not apparent on reasonable inspection) within a reasonable time

after discovery of the defect or failure. If delivery is not refused, and the customer does not notify us accordingly, customer shall not be entitled to reject the products and we shall have no liability for such defect or failure, and the customer shall be bound to pay the price as if the products have been delivered in accordance with the Contract.

- Where any valid claim in respect of any of the products which is based on any defect in the quality or condition of the products or their failure to meet specification is notified to us in accordance with these Conditions, we shall be entitled to repair or modify all defective products free of charge provided that the products are returned to our works carriage paid. If the customer does not wish to return the goods, they will be repaired free of charge at the customer's nominated premises provided that the customer reimburses us for travelling expenses, time and out of pocket expenses. Ashley-Edison shall be entitled, at its sole discretion, to replace the products free of charge or, refund to the customer the price of the products (or a proportionate part of the price), but we shall have no further liability to the customer.
- Except in respect of death or personal injury caused by our negligence, Ashley-Edison shall not be liable to the customer by reason of any representation, of any implied warranty, condition or other term, or any duty at common law, or under the express terms of the Contract, for any consequential loss or damage (whether for loss of profit or otherwise) costs, expenses or other claims for consequential compensation whatsoever (and whether caused by the negligence of Ashley Edison, its employees or agents or otherwise) which arise out of or in connection with the supply of the products or other use or resale by the customer, except as expressly provided in our standard conditions of sale.
- Ashley Edison shall not be liable to the customer or be deemed to be in breach of the Contract by reason of any delay in performing, or any failure to perform, any of our obligations in relation to the products, if the delay or failure was due to any cause beyond our reasonable control. Without prejudice to the generality of the foregoing, the following shall be regarded as causes beyond our reasonable control.
    - Act of God, explosion, flood, tempest, fire or accident;
    - War or threat of war, sabotage, insurrection, civil disturbance or requisition;
    - Acts, restrictions, regulations, bye-laws, prohibitions or measures of any kind on the part of any governmental, parliamentary or local authority;
    - Import or export regulations or embargoes;
    - Strikes, lock-outs or other industrial actions or trade disputes (whether involving employees of Ashley-Edison or of a third party);
    - Difficulties in obtaining raw materials, labour, fuel, parts or machinery;
    - Power failure or breakdown in machinery.

For details on our full Standard Terms and Conditions of Sale please check out –

http://www.AshleyEdison.com/terms

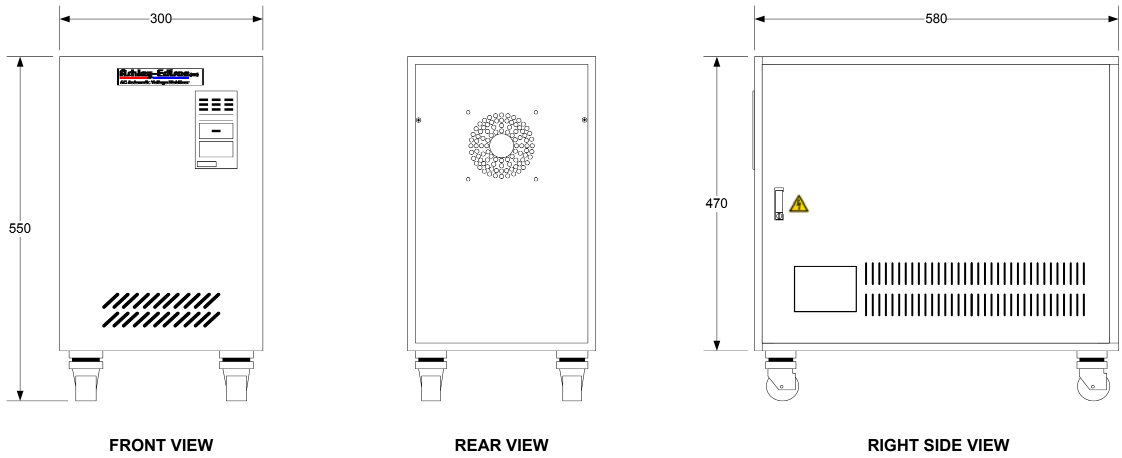
12. APPENDIX

12.1 TECHNICAL SPECIFICATION

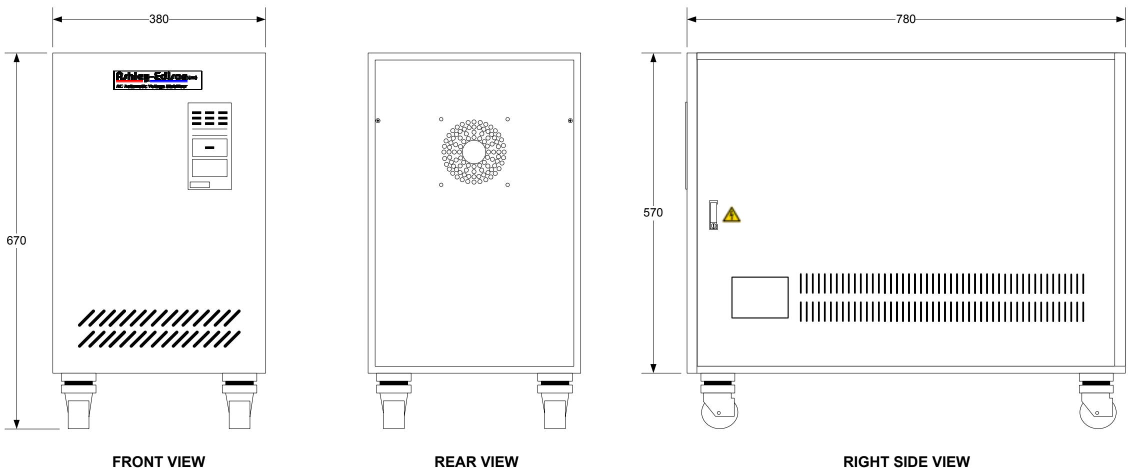
Input Voltage:	See Label on the Unit
Output Voltage:	See Label on the Unit
Output Voltage Accuracy:	±0.5% (H & LY Series) ±1% (HD & LD Series)
Frequency:	47 to 65Hz
Response Time:	<1.5ms
Correction Time:	A 10% supply variation will be corrected to within 2.5% in 0.6 seconds
Efficiency:	98%
Total Harmonic Distortion:	<1%
Soft Switch-ON:	This feature ensure that the output voltage is at its minimum upon Switch-On before it commence full stabilisation
Power Factor:	Any lagging to 0.95 leading
Surge Ratings:	10 x max current rating for 2 second 3 x max current rating for 1 minute 2 x max current rating for 5 minutes
Surge Suppression:	Protects loads against high-energy spike and transient Voltages
Independent Phase Control:	Maintain each phase voltage irrespective of load unbalance
Environment:	Temperature range -15 to 45°C. Derate by 2% for each additional °C up to max 60 °C. Suitable for indoor tropical use 95% RH (non-condensing)
Construction:	Enclosures to IP20, BS EN5490/IEC60529, NEMA 1
Conformance:	BS EN50081-1;2 / IEC 61000-4-3;4
CE Conformity:	EN55022, EN50082, ENV50140-1
Standard Features:	Input Circuit Breaker Bypass Control Switch Over/Under Voltage Trip Protection Phase-Failure Trip Protection Voltmeter / Selector Switch (internal)

12.2 ENCLOSURE TYPES

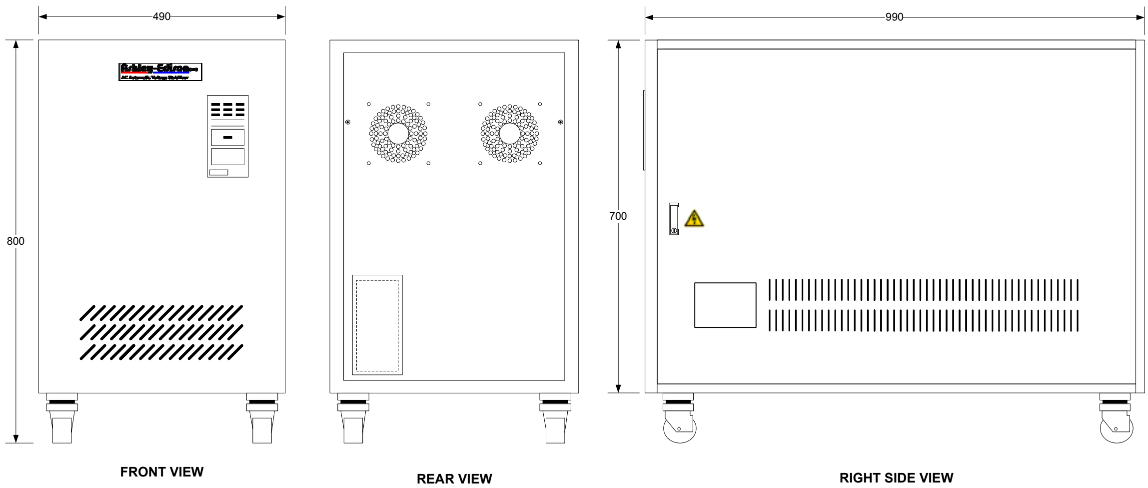
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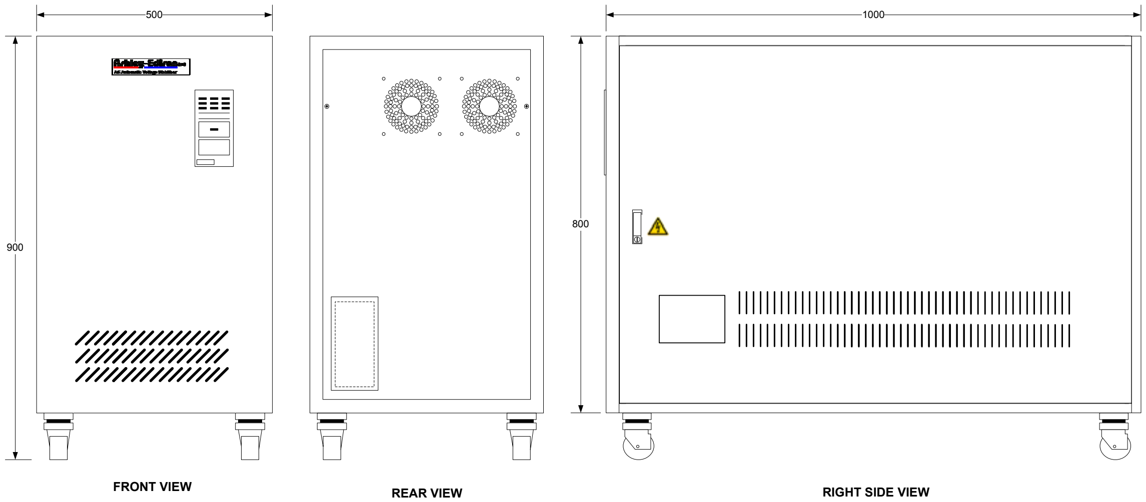
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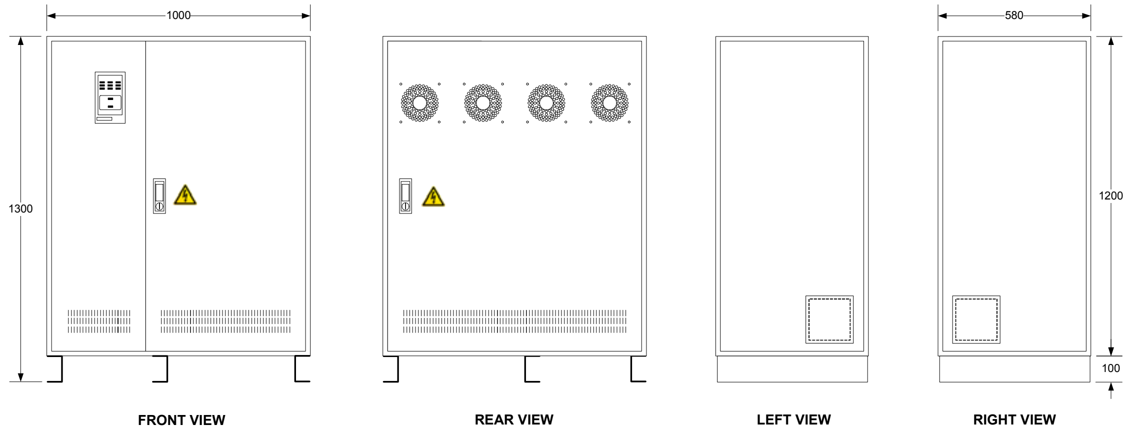
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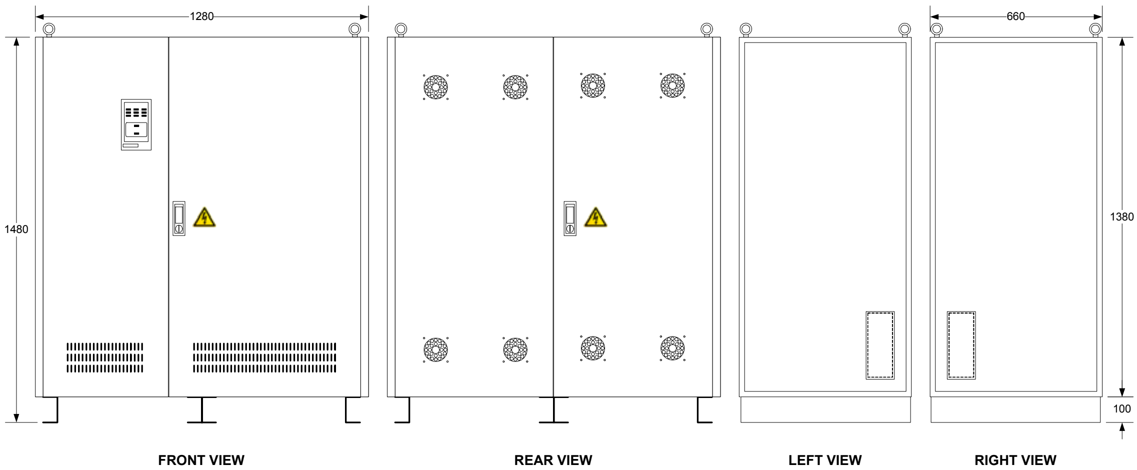
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ENCLOSURE NO: 335

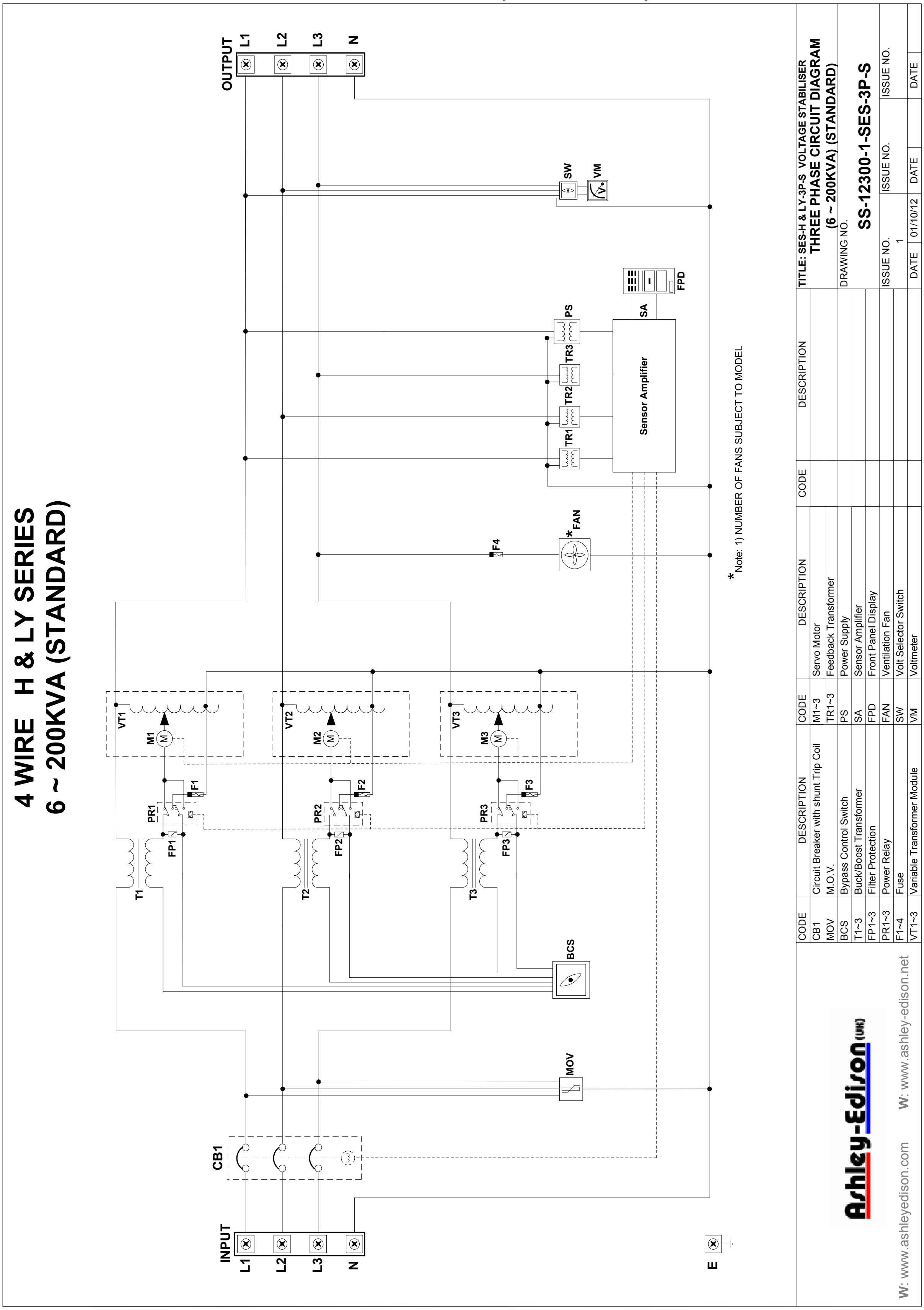


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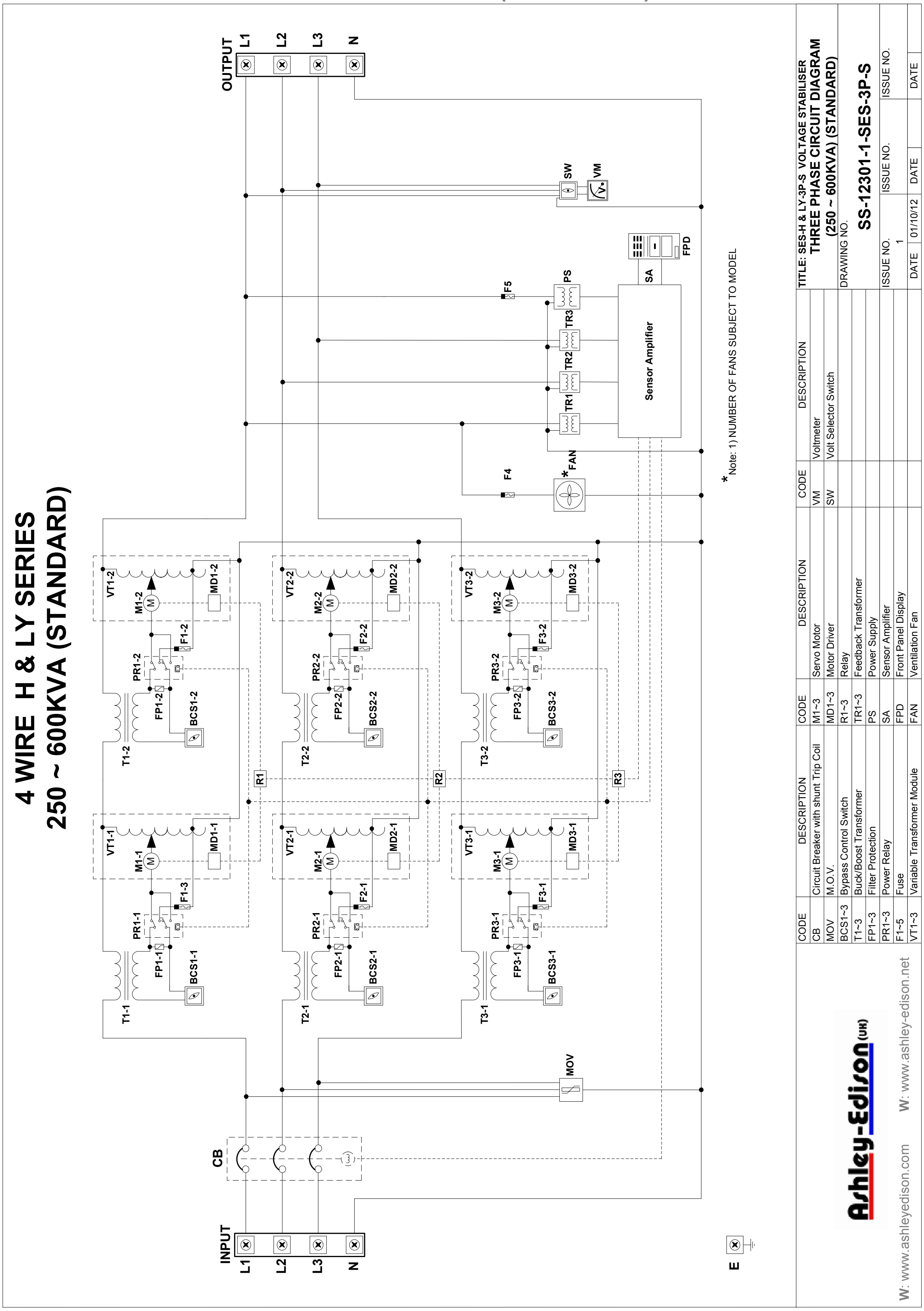


12.3 CIRCUIT DIAGRAMS (4 WIRE H & LY SERIES)

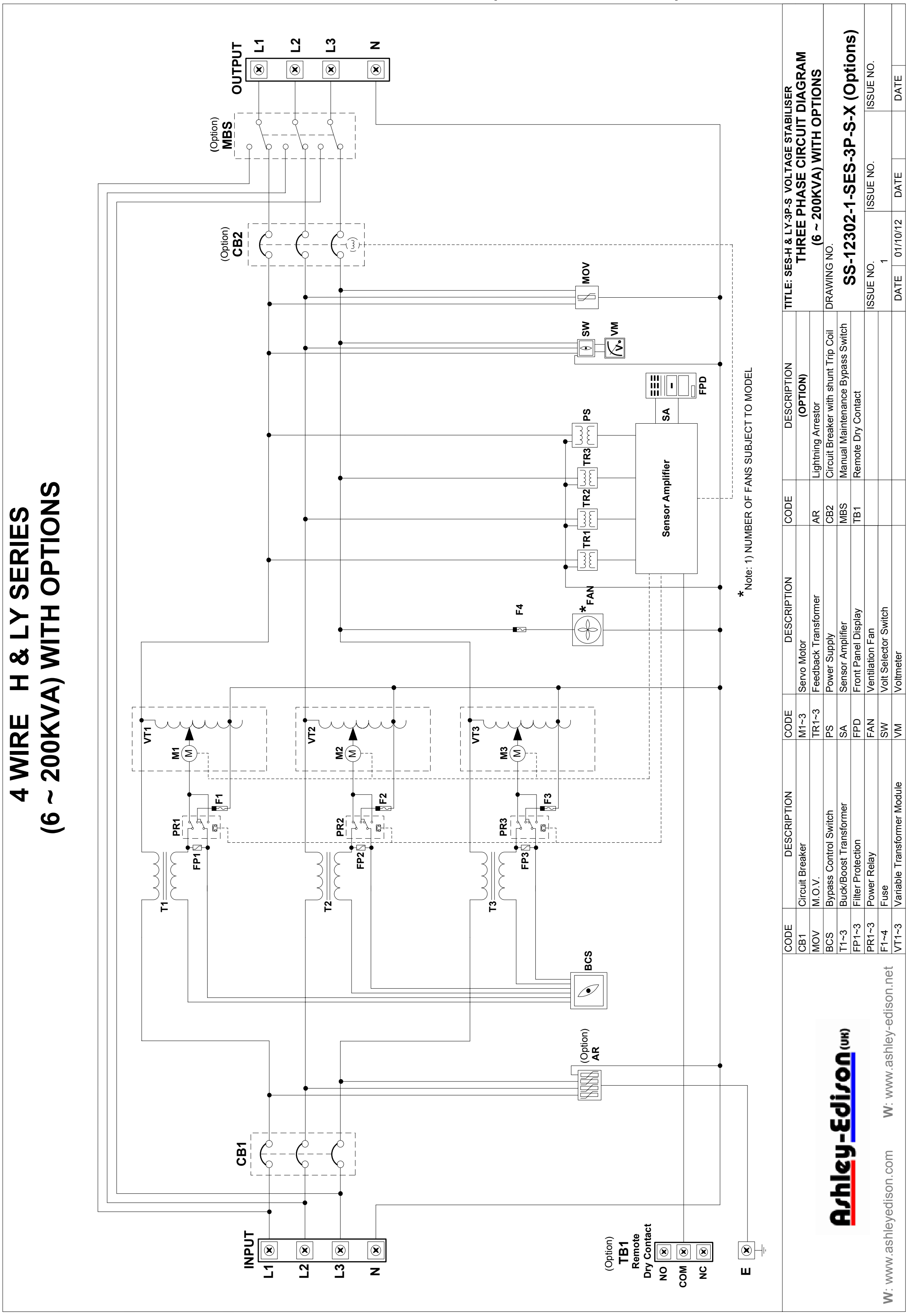
12.3.1 4 WIRE H & LY SERIES SOLUTIONS (STANDARD)–6~200Kva



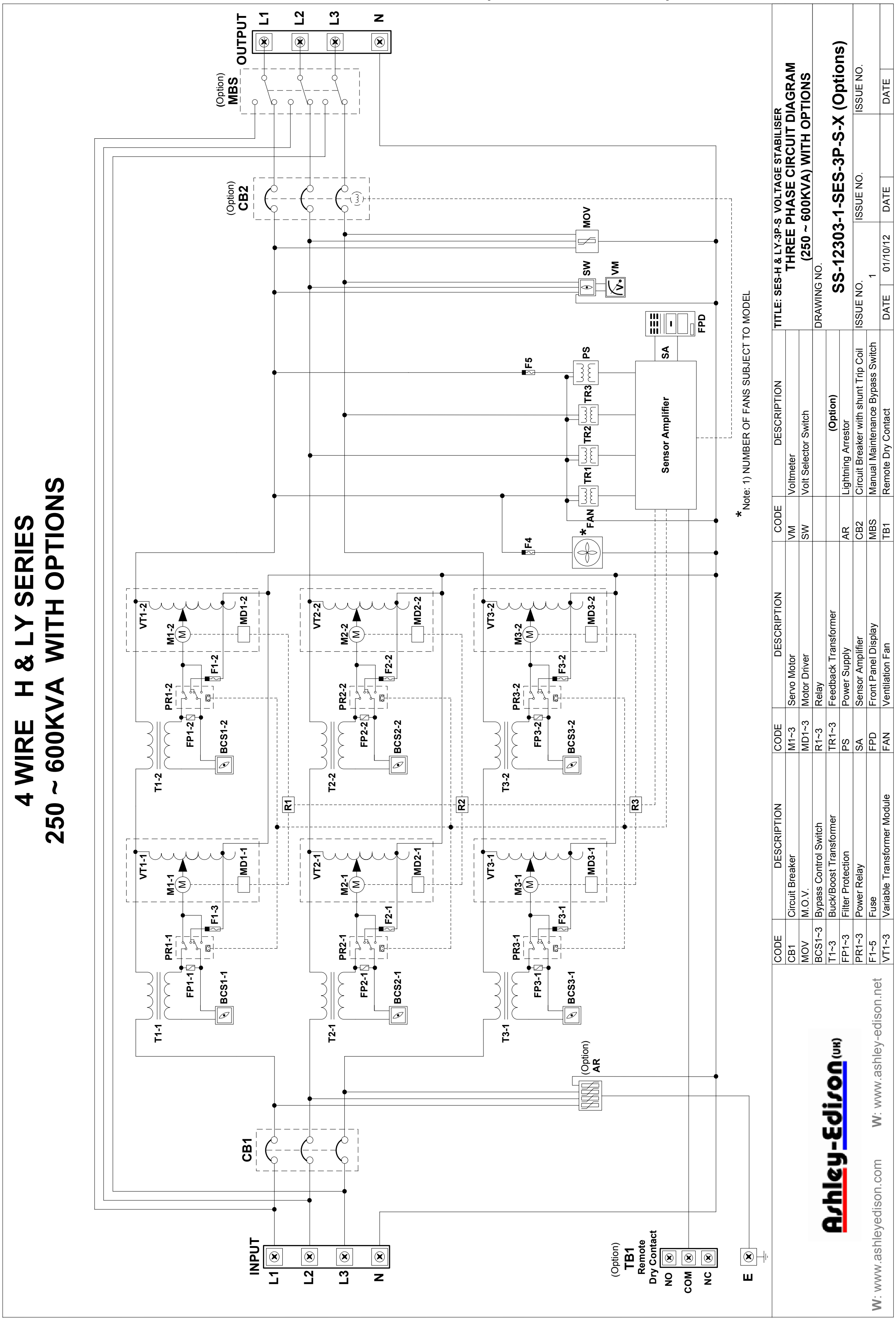
12.3.2 4 WIRE H & LY SERIES SOLUTIONS (STANDARD) – 250~600Kva



12.3.3 4 WIRE H & LY SERIES SOLUTIONS (WITH OPTIONS) – 6~200Kva

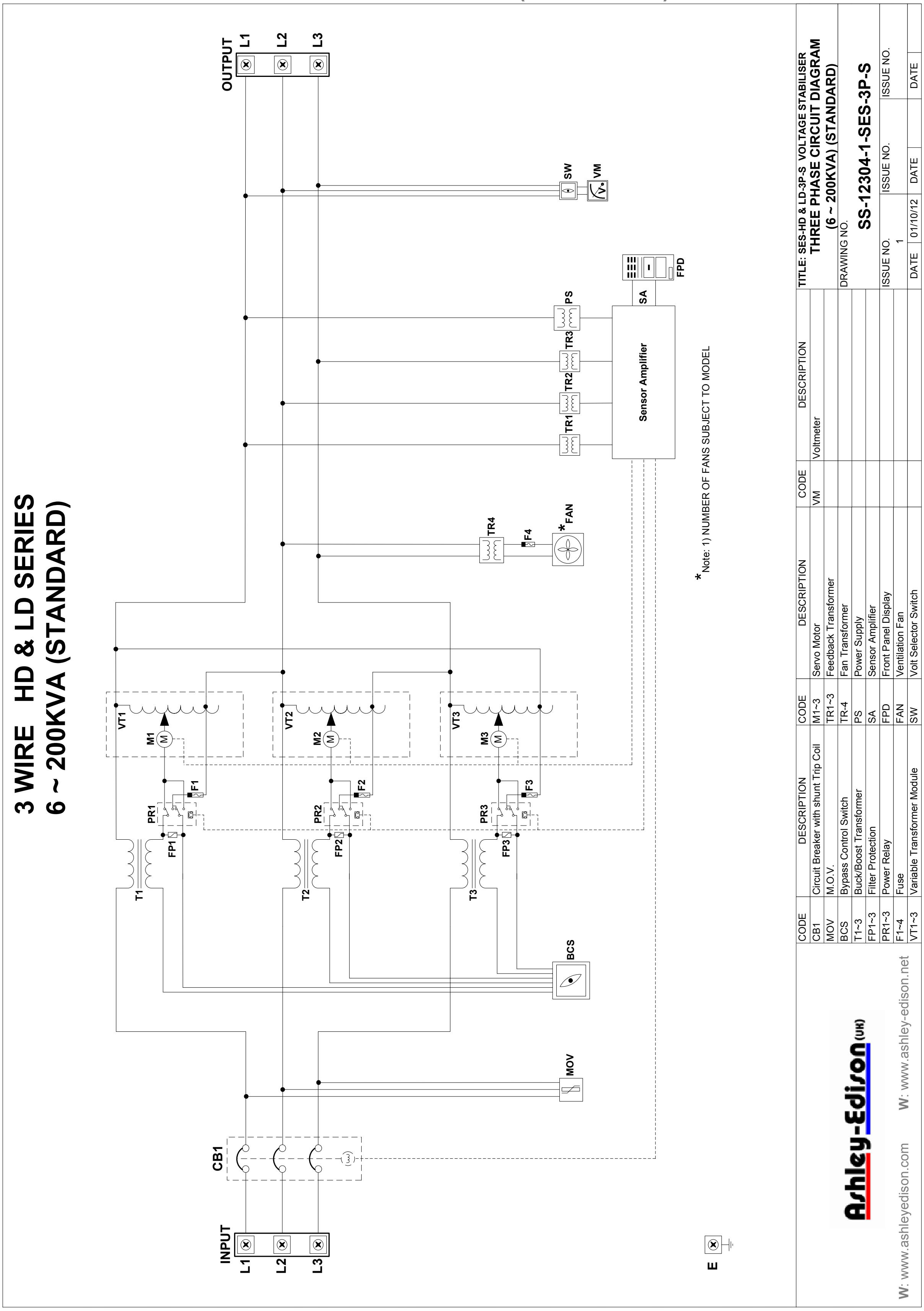


12.3.4 4 WIRE H & LY SERIES SOLUTIONS (WITH OPTIONS)-250~600Kva

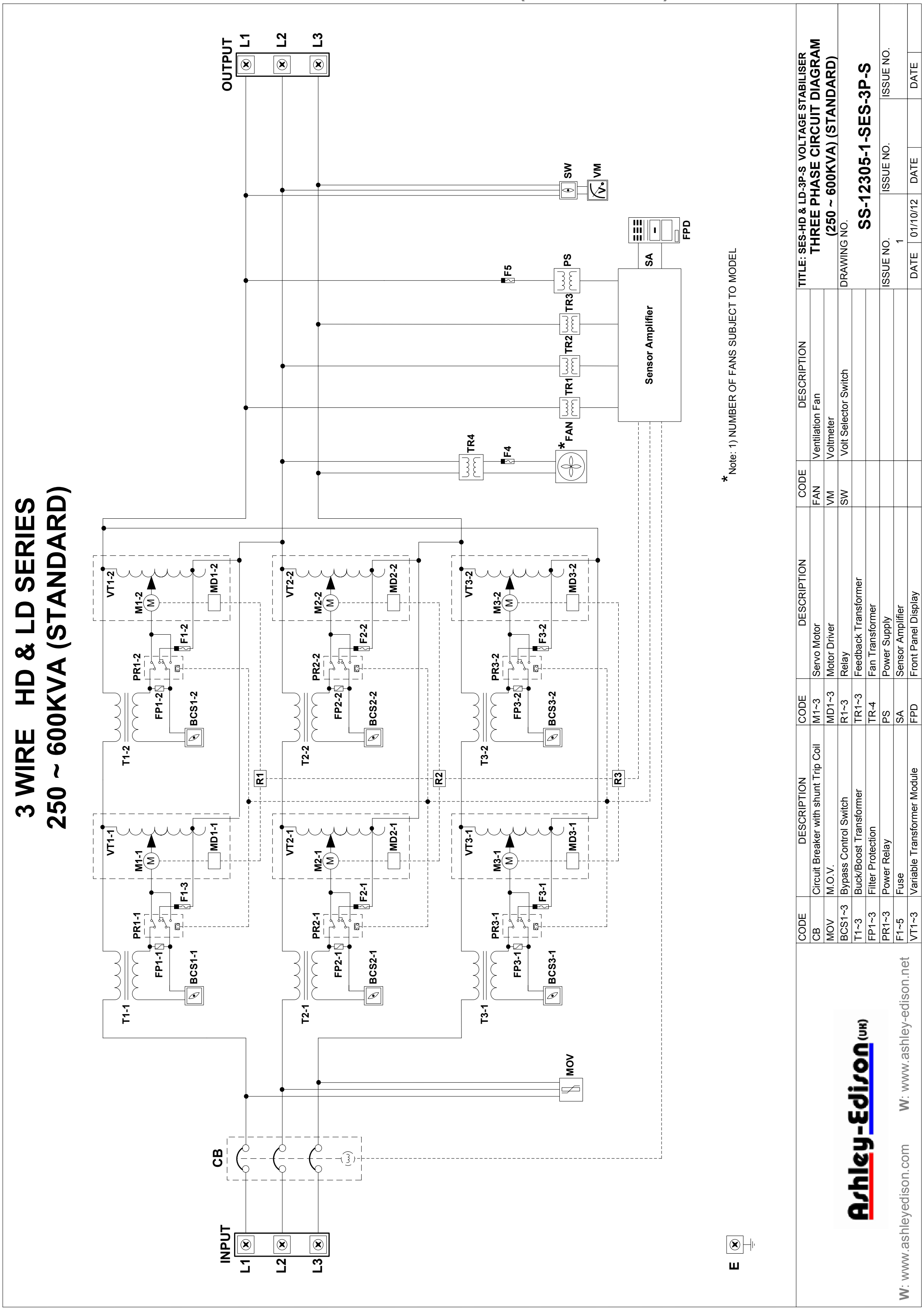


12.4 CIRCUIT DIAGRAMS (3 WIRES HD & LD SERIES)

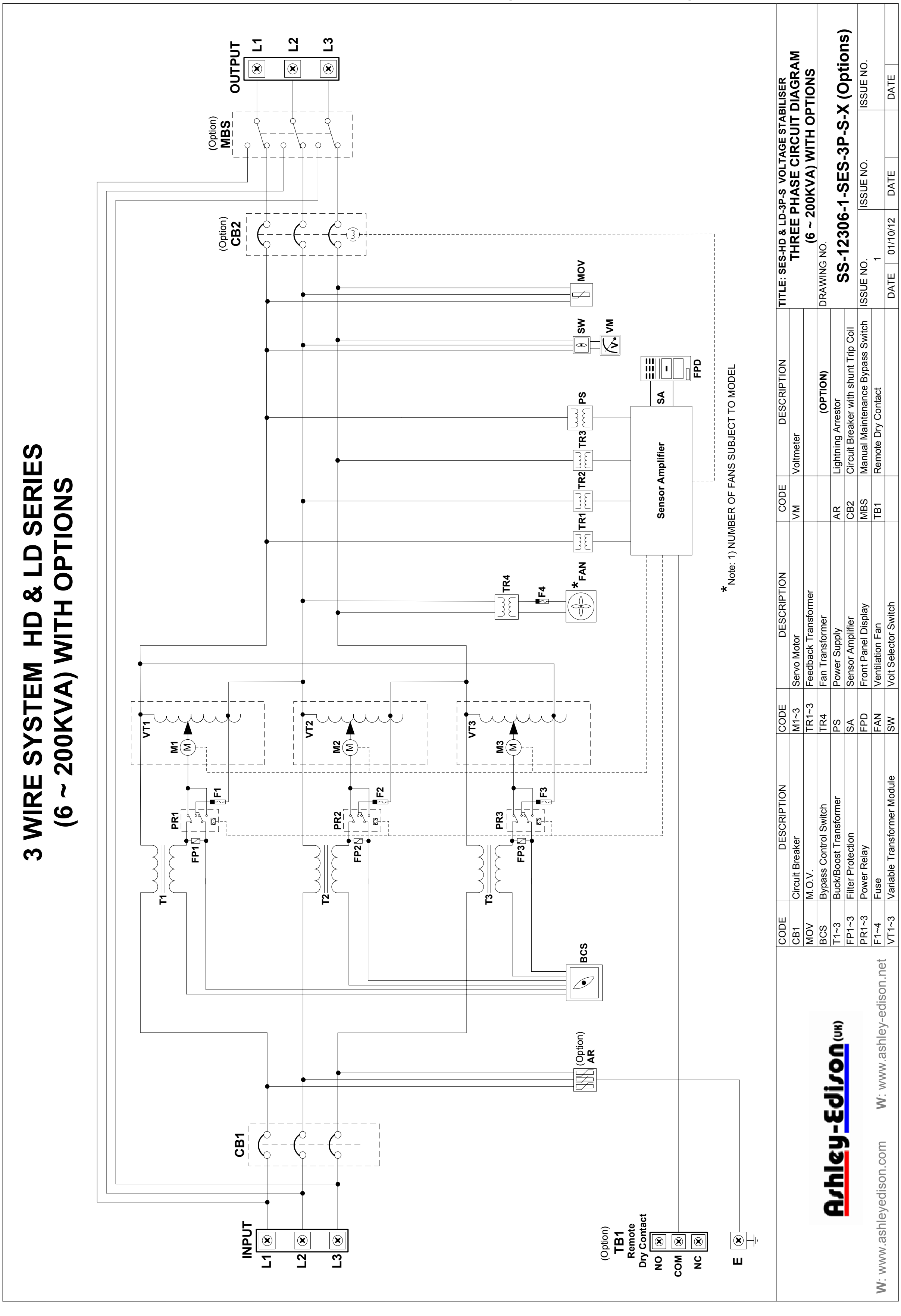
12.4.1 3 WIRE HD & LD SERIES SOLUTIONS (STANDARD)–6~200Kva



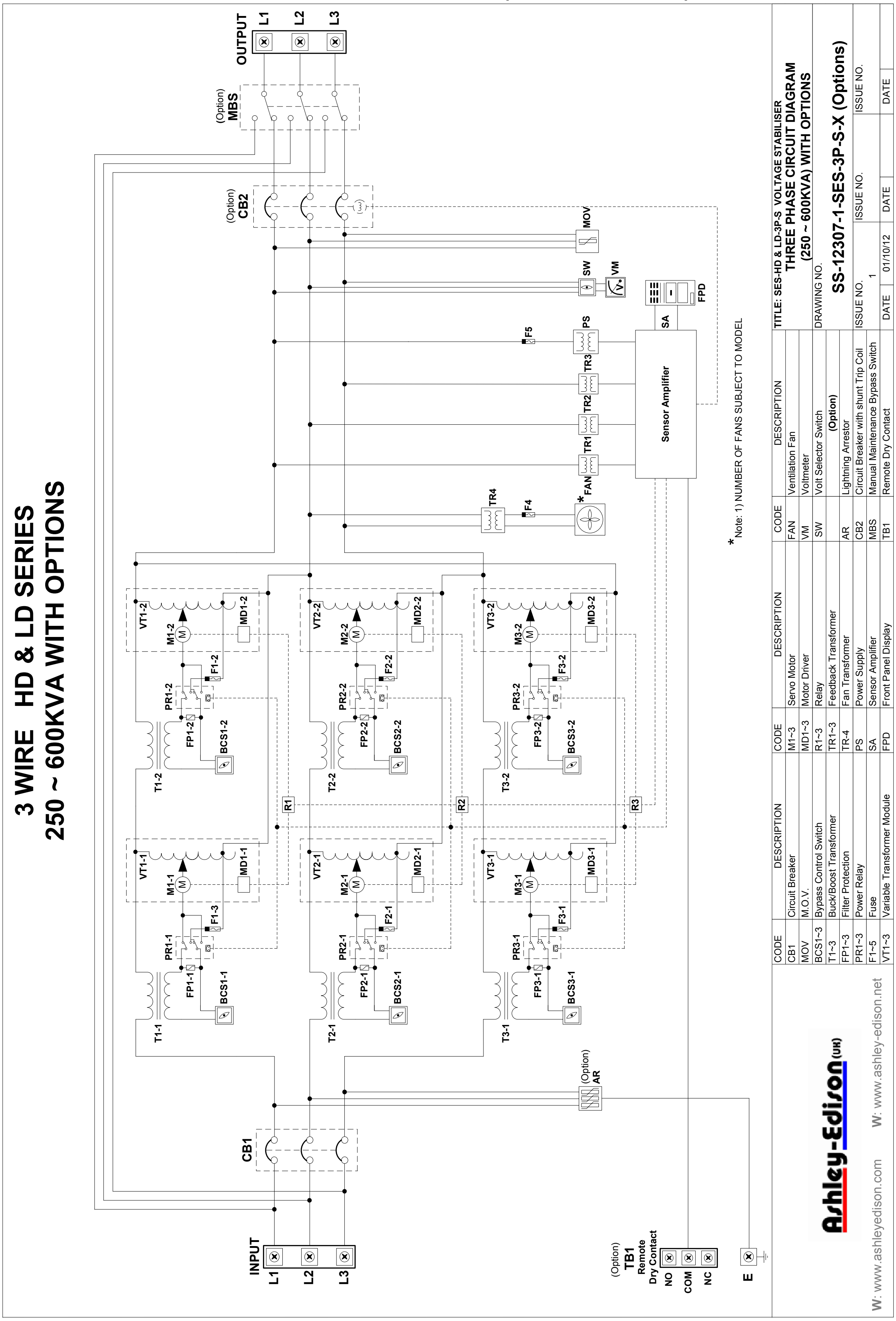
12.4.2 3 WIRE HD & LD SERIES SOLUTIONS (STANDARD)- 250~600Kva



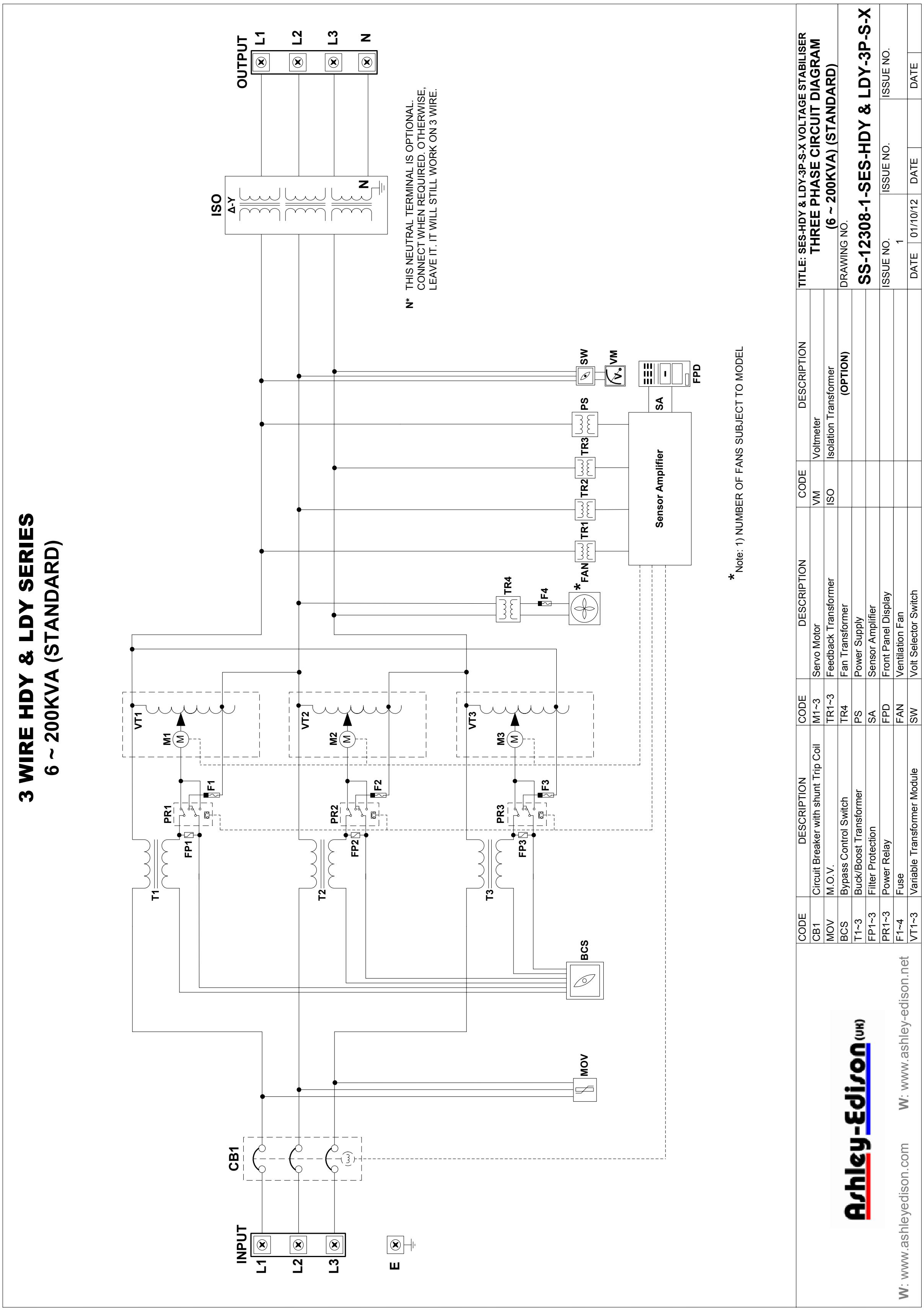
12.4.3 3 WIRE HD & LD SERIES SOLUTIONS (WITH OPTIONS)- 6~200Kva



12.4.4 3 WIRE HD & LD SERIES SOLUTIONS (WITH OPTIONS)–250~600Kva



12.4.5 3 WIRE HDY & LDY SERIES SOLUTIONS –6~200Kva



12.4.6 3 WIRE HDY & LDY SERIES SOLUTIONS (WITH OPTIONS)–6~200Kva

